INNOVA SERIES

MULTI-PURPOSE AUTOMATIC CUTTING MACHINE

USER MANUAL

1. GENERAL INFORMATION

1.1 Introduction

Dear Customers, congratulations on your purchase of the INNOVA SERIES sawing machine. It is designed as a heavy-duty rail saw with compact size, which can handle all fabrication needs. So it is ideal for cutting and profiling every kind of slab or tile.

Characteristics:

- **Multi-purpose**
  Cutting
  Beveling
  Grinding
  Notching
  Polishing
  Drilling
- **Different cutting length**
  2000mm 2500mm 3000mm
- Cutting head can tilt and rotate to any angle within 360 degree. Thus you can cut and polish the slope at any angle.

This USE AND MAINTENANCE manual must be read before using and kept by the foreman within building site, so it is always available for consultation. The manual is to be considered part of the machine and must be kept for future reference for the whole machine life. If it is damaged or mislaid, a new copy can be requested from the manufacturer. To guarantee the safety of the operator, the safety of machine functioning and a long life for the machine, the instructions in the manual must be respected, together with the safety and work accident prevention regulations as per current legislation. Suitably safe equipment must be used (safety shoes, gloves and glasses).

1.2 Consulting this manual

The following description is various types of symbol which will be seen when reading this manual.

1.2.1 Notes (symbol ◆)

The notes highlight information which is particularly useful for correct machine functioning.

1.2.2 Safety warning (symbol ⚠)

Failure to observe the safety warnings may lead to injury, both for the operator and other persons.

1.2.3 Danger signal (symbol ⚠)

The danger signal indicates situations of special danger where the operator risks serious injuries.

1.2.4 Refer to illustrations

When the text refers to an illustration, for example: "... (Fig.12.1C) ...", refer to part C in figure number 12.1. Some illustrations are included in the context, while others are annexed.

1.3 Recommendations for assistance

When compiling this manual, we kept in due consideration all the adjustment and service operations which are part of normal maintenance. We recommend that no repairs or operations are carried out which are not indicated in this manual. All operations which require parts to be dismantled must only be carried out by qualified personnel.

1.4 Introduction to use

Before beginning machining with the sawing machine, read this instructions manual carefully to understand the machine, its uses and any possible counter-indications. The machine must be used exclusively for the uses hereby specified, use it as recommended in this manual and do not try to tamper with it or force it, or to use it for purposes not mentioned. We declines all responsibility in the case of non observance of the laws which regulate the use of such equipment, in particular: improper use, power supply anomalies, neglect of maintenance, unauthorized modifications, partial or total non observance of the instructions contained in this manual.

⚠***-It is forbidden to carry out modifications of any kind on the machine's metal structure, and electrical system.***

1.5 Description

Innova 2000/2500/3000 series are sawing machines designed and manufactured by us for cutting tiles, ceramics, marble, granite, cement products and similar products. Only

continuous crown or sector diamond-dressed blades, constantly water-cooled can be used. Blades for dry cutting must not be used under any circumstances and any material not specified in this manual must not be cut with the machine. We decline all responsibility for damage caused by improper use of the equipment.

1.6 Technical Characteristics

INNOVA is a very versatile machine which can be used for a vast range of uses.

Technical Data		
Diameter of diamond blade	mm	350
Diamond blade center hole	mm	25.4
Cutting dimension (LxW)	mm	2000/2500/3000x1750
Packing Size	mm	
Net Weight	Kg	
Gross Weight	Kg	
Rotation direction of blade		Anticlockwise
Frequency	Hz	50
Motor Power	Kw	3.8
Motor Speed	rpm	2800
Voltage	V	380

1.7 General Safety Precautions

Please remember that this machine has been manufactured to offer, as well as better performance, maximum safety: however, it is the operator who must guarantee this safety, by taking the necessary precautions in all work phases. The operator is advised to:

1. Ensure that the earthing unit is suitable.

2. Only work with all the guards in place and working correctly.

3. Keep the machine clean: the general cleaning of the machine (and work surfaces in particular) is an important safety factor.

4. Stop the machine completely before cleaning it or removing any guard (for maintenance or removal of any component): turn the main switch to zero and disconnect the plug. If the machine is cleaned with water jets, do not spray water directly on the power supply unit or electrical motor.

5. Remove rings, watches, bracelets and ties: experience has shown that these and other objects can lead to accidents. In addition, make sure sleeves are closed tightly on the wrists, keep hair tied back and use robust footwear.

6. Do not machine pieces which are beyond the size suitable for the characteristics recommended by the machine manufacturer

7. Tighten screws, bolts and ring nuts for each instrument to the torque envisaged, without exceeding the normal values and without using levers or hitting the spanners.

8. Always use the personal protections: accident prevention glasses which conform with standards, suitably sized and customized gloves, ear muffs or earplugs and hair nets, if necessary.

9. Use the original tools recommended by the manufacturer to ensure maximum machine performance.

10. Always keep the hands far from the machining areas when the machine is running. Before removing any parts near the disk, stop the disk rotating by pressing the stop push-button.

11. The instructions contained in this manual are for the users of the machine (operators, maintenance personnel).

12. Never use cracked or deformed grinding disks.

13. Never use the disks at a speed higher than that indicated by the manufacturer.

14. Only use diamond-dressed crown disks, of a type suitable for the material to be cut and which conforms to the safety

1.8 General Warnings

- Do not load the machine with excessively heavy pieces.
- Pay attention to the stability of both the pieces, before, during and after cutting, and the machine, using, for example, the additional support surface set up at the same height as the work surface (series of rollers with idle rollers).
- Dispose of waste liquids from the cutting process in suitable containers.

1.9 Safety Measures

The INNOVA sawing machine was designed to be used in building sites in daylight and in laboratories with natural or artificial light not less than at least 500 LUX.

⚠ ***The machine must not be used in environments***

where there is the risk of explosions and/or fires or in underground sites.

- The INNOVA sawing machine can only function if it is fitted with all the protection devices in perfect condition.
- Do not use improvised and/or faulty power lines.
- The power supply lines in the building site must be placed in such a way that they cannot be damaged. Do not place the sawing machine on top of the power supply lines.
- The power supply lines must be placed in such a way that they prevent water from penetrating the connectors. Only use connectors fitted with a water jet protection (IP55).
- Electrical unit repairs must only be carried out by specialized personnel. Do not make adjustment or maintenance operations when the machine is powered up or moving.

⚠ ***The machine must be connected to the conductor with a minimum cross section of 16 mm², the connection point is identified with a screw welded to the frame and by the plate with the earth symbol.***

⚠ ***To stop the sawing machine, only use the appropriate switch.***

- The symbol on the label indicates that it is forbidden to start up the machine if the guards are not all present and functioning correctly.

1.10 Electrical Safety

This machine is fitted with:

- a system preventing automatic start up after power supply failure
- protection against short-circuiting
- motor with overload protection

1.11 Safety Devices

The Innova series were designed in line with serious safety standards, which given utmost safety importance to operators. Safety and accessibility are combined perfectly in Innova.

1.11.1 Guards and Safety Devices

The machine is fitted with fixed guards secured with fixing crews to prevent access to the moving and dangerous parts. All the fixed guards, and covers secured with screws have been designed to protect the operators (maintenance personnel, technicians etc.) from injuries caused by electrical discharges and moving mechanical parts. Therefore, please don't modify or remove the guards from the positions where they have been designed for.

⚠ Before carrying out any machine maintenance or repair, the main switch must be turned off and disconnected.

2. MACHINE INSTALLATION

2.1 Lifting and Unloading

Please life or carry the machine with forklift or crane and make sure that the machine is securely positioned.

⚠ ***Always check that the resistance of the cable and the capacity of the crane/forklift truck are of sufficient size for the purpose, checking the weight of the machine on the appropriate metal plate on the machine.***

2.2 Positioning

Put the machine in the most suitable position, bearing in mind the electrical connections. The space required for use and maintenance should be enough.

Always disconnect power supply plug before moving the machine.

◆During installation, ensure that the legs are perfectly level on the floor of the building site to guarantee the stability.

2.3 Connect the machine to main power supply

Check that the main power supply unit to which the machine is connected has an earth connection as envisaged by current standards, and that the socket is operating correctly.

◆Remember that there must be an overload protection upstream of the main power supply unit which can guarantee the safety of all conductors from short circuiting and overload

⚠ ***Ensure that the electric line has a differential overload switch upstream.***

The electric power supply line must be sufficient to prevent voltage drops. In particular, cable drums (with collector rings) must not be used. The dimensions of the conductor must be based on the starting current and the length of the line. As per regulations, a 4x4 mm² conductor is sufficient, up to 50m. After installation it is still necessary to measure the voltage, with the load, both for start up and functioning. During functioning, voltage drop must be limited to 5%. If using longer conductors which are not optimal, use cable with a section of at least 6mm². The power supply cable used in the building site must be fire resistant and have a suitable outer sheath, resistant to squashing, wear and atmospheric agents.

⚠-***The machine must be connected to the earthing unit in the building site. The connection point is the screw marked with a plate and an earth symbol***

△The section of the earth cable should be the same as the section of the line conductors or at least conform to current legislation and technical standards in the country in which the machine is used

△Before making the connection, check the main voltage and frequency correspond to the machine specifications.

△The power supply lines in the work area must be positioned to ensure that they are not damaged and that water will not penetrate. Only use collectors and attachments fitted with water jet protections. Do not place the machine on the power supply lines. Suitable protection must be adopted.

△ Don't use temporary machine connection. The operation must be carried out by specialized personnel. Ensure that the attachment for the power supply cable in the plug-switch unit housing is stable.

△The work area must respect accident prevention and security device standards.

2.3.1 *Main requirements for the electrical cabinets*

The functioning principle of the electrical cabinets envisages a differential switch for starting the cutting unit and a switch for the transfer unit. If there is voltage drop, the rotation and transfer motors stop. When the voltage returns, the motor does not start again until the reset push-button is pressed. The electrical cabinet is positioned on right hand side of the machine to guarantee that the operator has easy access to the controls.

2.4 Machine noise level

The values given for the noise are emission levels and not necessarily safe work levels. While there is a correlation between the emission levels and the exposure levels, this cannot be used as a reliable indicator to establish if further precautions are required or not. The factors which influence the real level of exposure for the worker include the duration of the exposure, the environmental characteristics and other noise sources, for example, the number of machines and adjacent work areas. The exposure levels permitted can also vary from country to country. However, the following information enables the user to make a better estimation of the dangers and risks.

⚠-**Prolonged exposure to noise above *85 dB(A)* may damage health. It is therefore recommended that appropriate protection measures (e.g. ear muffs, plugs etc.) are taken.**

3. MACHINE USE

3.1 General Description

Once the machine installation has been completed, machining can begin. Innova series consists of a stainless steel cutting surface. The 3.7 kW motor and the working head are fitted on a pre-stressed aluminum body with high mechanical resistance. The working head can be tilted and turned to any degree from 0 to 180° . The operating unit is driven by a transfer unit connected to the cutting unit. The machine is fitted with a mobile tank. The cooling pump immersed in the tank guarantees lubrication of the disk during the cutting operation. For vertical cutting, the pieces must have a maximum length of 3000 mm and a maximum thickness of 100 mm. For 45 degree tilted cutting, the pieces must have a maximum length of 3000 mm and a maximum thickness of 45 mm. The machine consists of a mobile cutting part, a fixed machine support frame, a disk cooling

tank and an adjustment unit. The machine is fitted with protection devices to guarantee maximum functioning safety. There is an emergency stop switch on the electric cabinet.

3.2 Functioning

3.2.1. Preparation Work

1. The power supply parameter is listed below:

3 phase

5 lines: 3 live lines 1 earth line 1 zero line

380V 50HZ

Input power: 3.7kw

Please fix the water-proof plug on the right leg (as shown on the picture). Please connect the 5 lines on the plug.

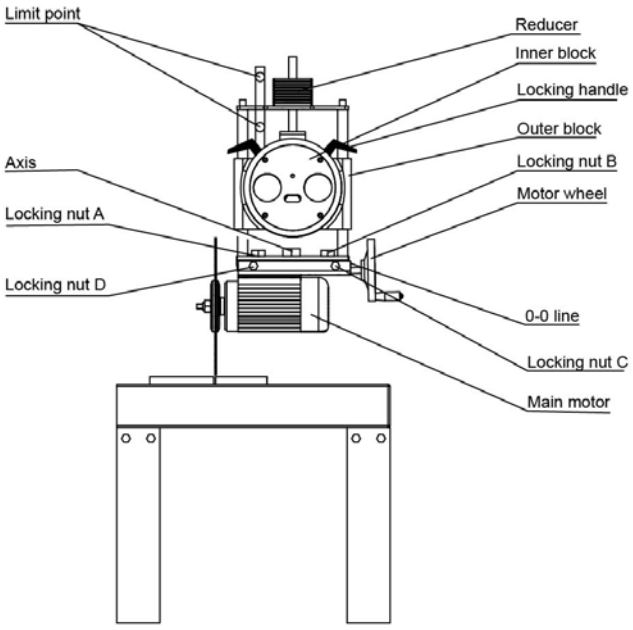
⚠ It's prohibited to operate the machine before connecting earth line to the plug.

2. Fix all the screws and nuts tightly.
3. Ensure that the blade is suitable for the material being cut.
4. Check if the rotation direction of motor is in accordance with the indication on the blade cover.
5. Check motor and water pump works normally or not. Ensure that the cooling liquid tank is full
6. Check if the limit switch is valid.
7. Start up the pump by turning on main motor and wait until the water wets the blade.
8. Check the position of blade compared to the cutting line.
9. The cutting speed must be adjusted in relation to height and type of material to be cut to avoid overloading the motor. The cutting speed can be adjusted by checking, during work phase, the motor absorption, which can be referred to the amperometer. The speed can be adjusted by turning the knob on main control panel.

3.2.2. Cutting Operation

Innova functions as follows:

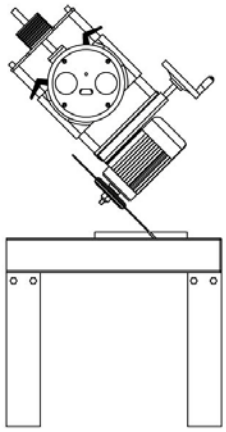
1. Straight Cutting



1. Please turn the main motor to position as shown on the picture, and then confirm label "0-0" is on one line. Use a spanner to fasten tightly the locking nut A and B. Also confirm that 0-90° is on one line, and then fasten the locking handle.
2. Turn the wheel on motor to make sure that the blade is on middle position between the gap of table. Lock nut C and D.
3. Start up and down operation, to stop blade 10mm under the table surface. Blade size can be optional between 300 and 350mm.
4. Move the stop ring on 2 rails to change the cutting length.
5. Sharpen the blade. Prepare a firebrick before cutting and start the motor to cut the brick more than 20 times until the diamond part on blade is very sharp.
6. Auto cutting operation:
   Push the "Auto Cutting" button, then motor will work and blade go down. The cutting operation starts. When the limit switch touches the stop ring, the motor will stop, ascend, and move back to the starting point fast and then stop there. Please take away the well-cut stone and change another one, another auto cutting operation will start like above.
7. Manual cutting operation:

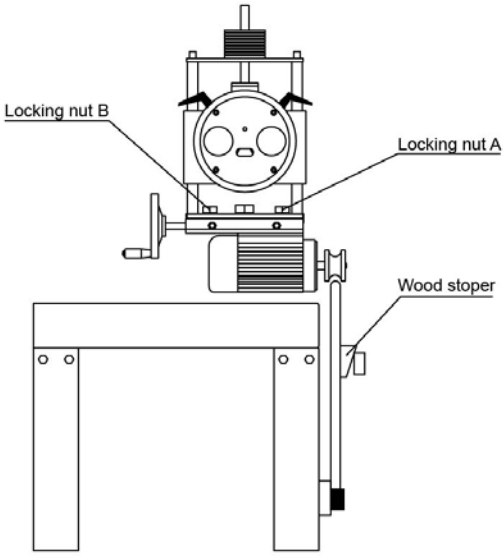
Press “LEFT” “RIGHT” “UP” ”DOWN” button on the control panel, you can start manual cutting operation according to different size of stone. When the limit switch touches stop ring, the motor will stop. Then you need to push the relevant button to start other operations.

2. Bevel Cutting



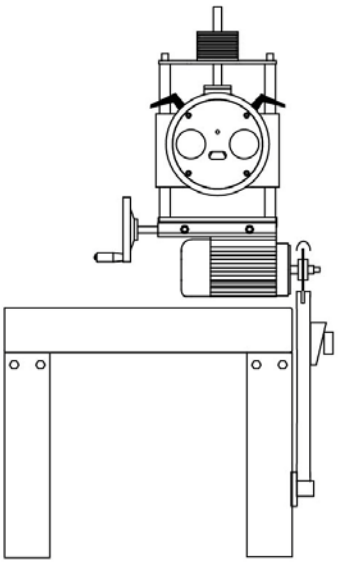
Turn the revolving body on rails to make 0-45° on one line, then fasten the locking handle. Adjust the position of blade by pressing UP or DOWN button or turning the wheel on motor to locate blade between middle of the table gap, and stop it 10mm under the table surface. Lock nut C and D, then start cutting.

3. Grinding and milling



1. Change the blade cover to smaller one. Fix milling wheel instead of blade.
2. Loose nut A and B, turn motor 180° and make 0-0 on one line. Lock the nut.
3. Put stone on the back holder (as shown on pic.) Adjust the height of holder and motor to make milling wheel touches the surface of stone.
4. Check if side surface of stone and the wheel is parallel. If not, adjust bit by bit one side of the back holder to make them parallel.
5. Put the wood stopper tightly between stone and steel bar.
6. Adjust the stop right on rails to proper position according to different cutting length.
7. Press “AUTO GRINDING” button to start main motor. The motor starts to mill to and fro. When every stroke stops and the motor move back to start milling again, press DOWN button manually bit by bit until the shape is finished.
8. After milling, you can change same shape grinding wheel to polish the surface of edge.

4. Notching

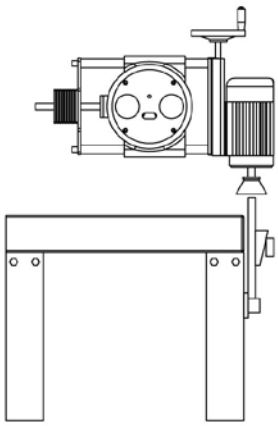


1. Adjust motor to the position shown on picture.
2. Put the stone on back holder like the picture.
3. Change notching blade with smaller size and sharpen it with firebrick many times.
4. Manually adjust the LEFT and RIGHT button to fix blade on middle of stone edge.
5. Start main motor and press DOWN button. As soon as the cutting depth is enough, stop pressing it right away,

and press UP button to remove blade from stone.

6. Move blade to the second position and then start notching again.

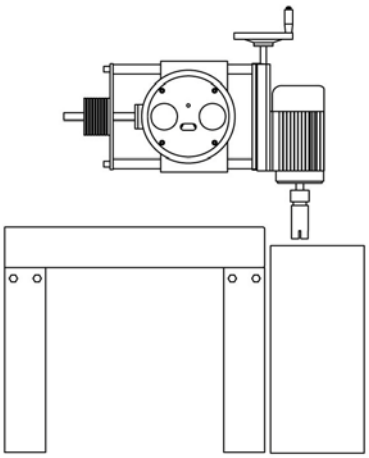
5. Grinding



1. Move the head to position as shown on picture.

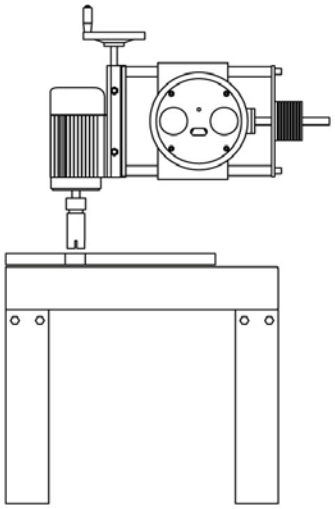
3. Adjust one side of back holder, to make sure that the surface of stone and grinding wheel parallel.
4. Adjust the 2 stop rings on rail according to different cutting length, and then push AUTO Grinding button to start grinding. Manually turn the wheel on motor to adjust pressure on stone. Change different grinding wheel until satisfied.

6. Drilling big stone



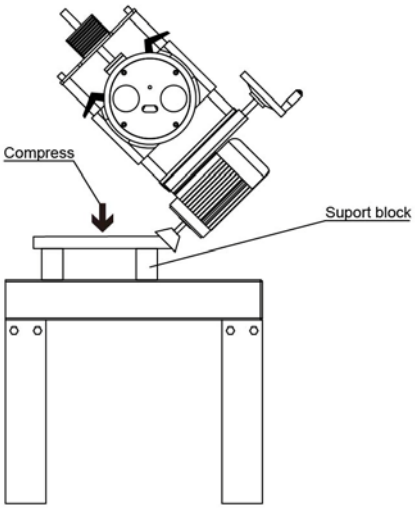
Adjust cutting head to position shown on picture.

7. Drilling Slab



Adjust cutting head to position shown on picture, you can easily drill holes on slab.

8. Polish any tilting angle



The head can be fixed at any angle by turning the head to the position needed.

3.3 Operating Unit

The operating unit consists of the following:

1. A sliding unit guided by bearings
2. A reducer motor
3. A cutting motor which drives the blade and wheel

3.4 Machine Use

For correct machine use, we recommend that the user follows these important procedures:

1. Leave a minimum of 60cm of free space around the machine for safety reasons.
2. Do not allow unauthorized persons to approach the machine during cutting.
3. Do not use the machine in areas where there is a risk of fire as sparks may cause fires or explosions.
4. Always turn off the power supply before positioning and moving the machine.
5. Always ensure that the disk is not in contact with anything before starting up the motor.
6. Check that the guards are all in the correct position.
7. Check that the rotation direction of the disk is the same as that indicated on the guard.
8. Before starting to machine, fill the water tank. Check and, if necessary, top up the level of water during use: the pump suction head must always be immersed.

⚠***-It is absolutely forbidden to create unnecessary safety risks, by removing the machine guards.***

9. All the disk adjustments must be made with the motor turned off.

4. MAINTENANCE

4.1 Introduction

The normal operations for ordinary maintenance can be carried out by non specialized personnel provided they observe the safety indications listed in the previous and following paragraphs.

4.2 Machine Cleaning

The machine must only be cleaned when the machine is at a standstill.

- Do not use compressed air: this would send dust and residuals into the most inaccessible corners of the machine.
- Check that the cooling liquid nozzles are not blocked.
- We recommend that the cooling water in the tank is changed everyday.
- Do not use detergents or lubricants which may harm the materials of which the machine is made.
- Check that the plug and plug-switch unit contacts are damaged or not. If they are oxidized, clean and change them immediately.

4.2.1 Dismantling the tank

There are locking nuts on side of top. Just loose them you can easily take off it from the machine.

4.2.2 Cleaning the tank after machining

At the end of a work shift, dismantle the tank after emptying it and wash it thoroughly to remove the cutting deposits which have formed. Clean the tank every time that sediment forms on the bottom, or at least once a day. Failure to clean the tank could create problems for the water pump which circulates water for cooling the blade. To clean the tank, remove it from the machine and wash it down with direct water jets. Then clean it by hand with cloths or brushes.

4.2.3 Cleaning of the rail and table

The table surface and rail must be kept clean. Deposits of dirt on these surfaces may cause inaccurate cutting.

4.2.4 Cleaning and maintenance of the cooling unit

If water does not arrive, stop the cutting immediately to prevent damaging the disk. Perform the following ordinary maintenance operations:

1. Turn off the machine and check that the water level in the tank is sufficient.
2. If necessary, after disconnecting the power supply, check that there are no obstacles in the valve, in the pipe or in the pump filter.
3. If necessary, check that the rotor is turning freely (after a long period of inactivity).
4. If necessary, dismantle the pump and ensure that the rotor/ motor joint is working correctly.

4.3 Replacement of blade

The diamond-dressed disk is manufactured in special material for cutting the materials described above and must be cooled with water during the work phase. To replace the disk, the following procedure must be followed:

1. Dismantle the front cover of blade
2. Loose the securing nut by turning it in a clockwise direction.
3. Take off the tightening flange carefully. Remove the disk by first moving it and then tilting it slightly to extract it from its housing.

◆ When remove the disk, ensure that the cooling water jet nozzle is not bent.

4. Insert the new disk, by carrying out the operations described in point 3 in reverse order, paying particular attention to the rotation direction of the disk.
5. Secure the disk nut correctly by turning it in an anti-clockwise direction.

⚠ ***Attention: when re-assembling the disk flange, check that there are no foreign bodies between the tightening flange and the disk. When cleaning the flange, do not use tools which may alter the shape of the flange.***

4.5.1 General warnings for blade replacement.

To replace the cutting disk, perform the following operations:

1. Do not use worn disks.
2. Only use disks which are suitable for the speed indicated on the machine plate.
3. Check that the rotation direction of the disk is the same as that indicated on the guard.
4. Ensure that the disk guard is secure.

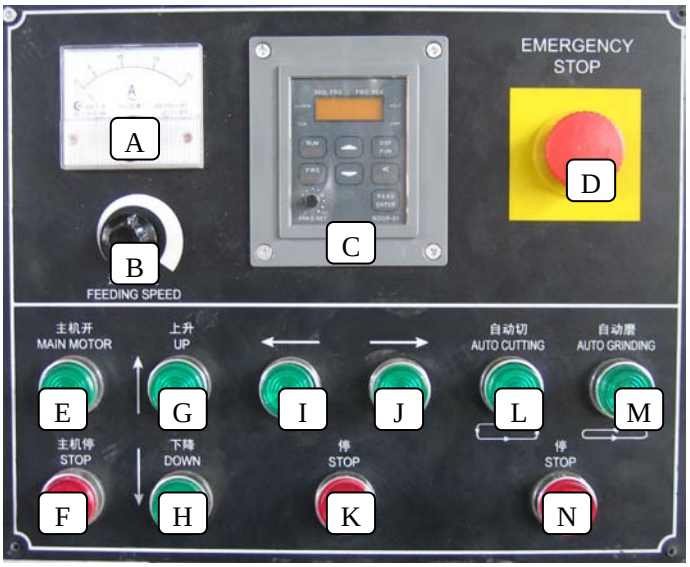
⚠ ***A disk which has not been fitted correctly, or a screw which is not secure enough, may cause damage to the machine or to personnel.***

Remember that the disk must have an outer diameter of 350 mm, a central hole with a 25.4 mm diameter and a maximum thickness of 3 mm.

5. Ensure that the disk which you intend to use is suitable for the material being cut.

4.4 Electrical Cabinet

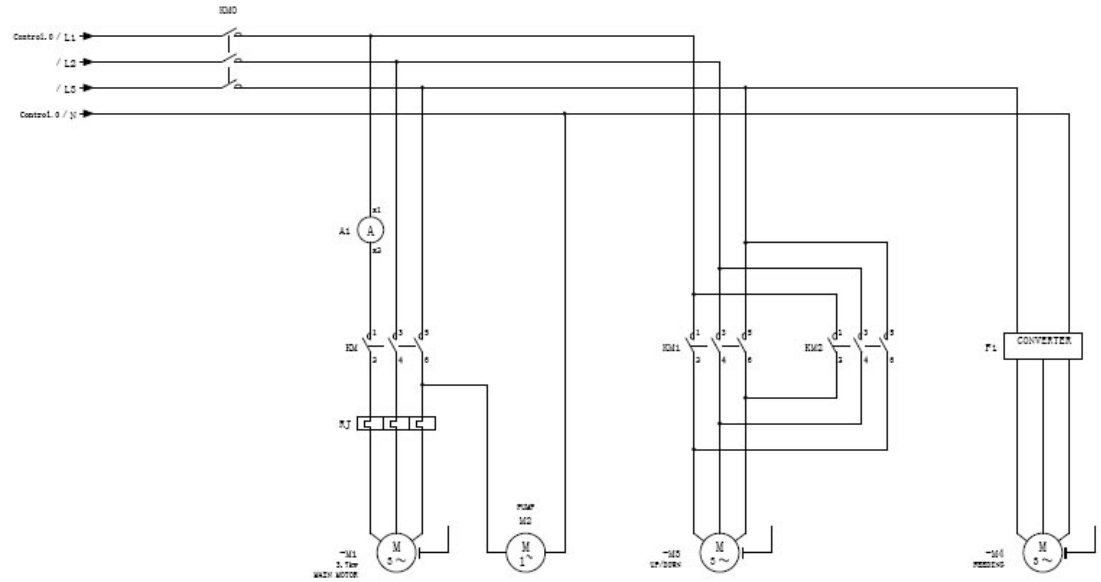
The electrical cabinet is an integral part of the machine and consists of the following:

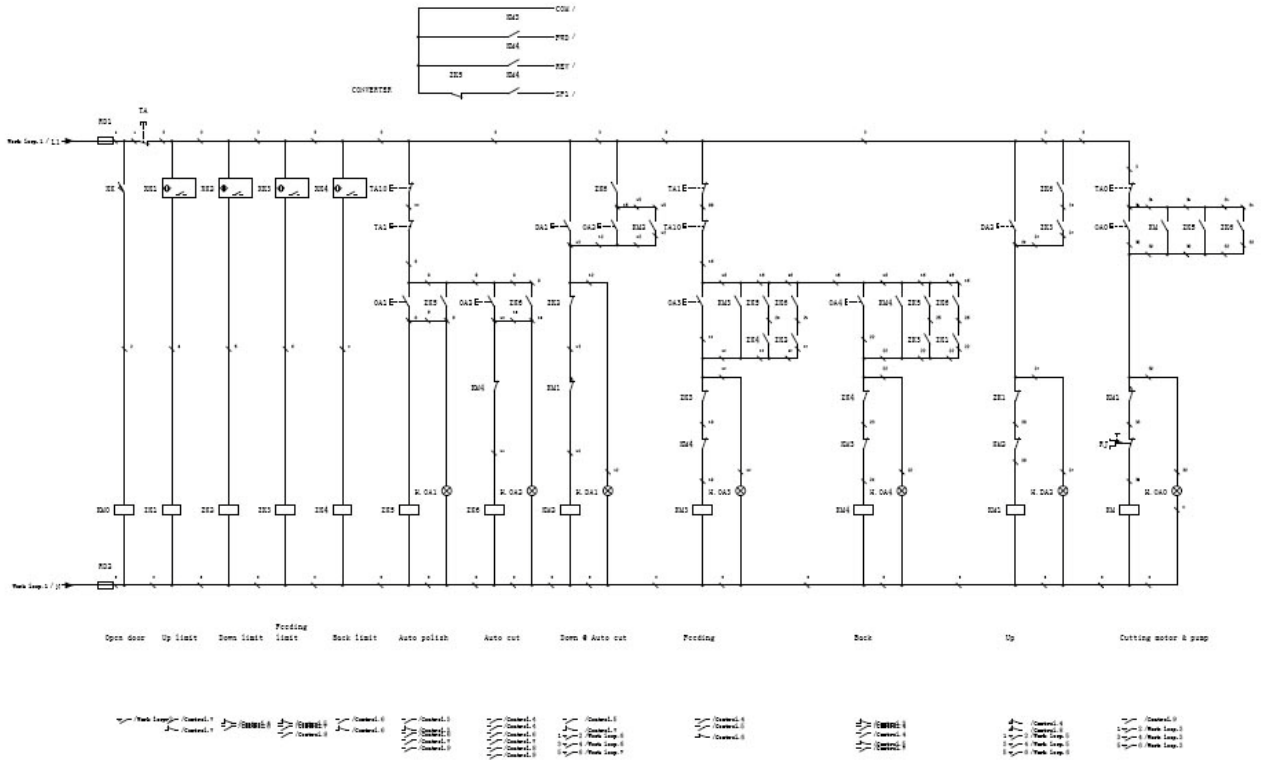


A. Amperometer
B. Feeding Speed Adjustor (Range from 0~60HZ)
C. Feeding Speed displayer
D. Emergency Stop
E. Main motor on F. Main motor stop
G. Blade up H. Blade Down
I. Blade Left J. Blade Right
K. Blade Stop
L. Auto Cutting M. Auto Grinding
N. Stop Auto Cutting or Grinding

4.5 Wiring Diagram

For wiring, the operator must consul the diagrams below.


KM0
Control.0 / L1
/ L2
/ L3
Control.0 / N
A1
KM
RJ
KM1
KM2
F1
CONVERTER
-M1
3.7kw
MAIN MOTOR
PUMP
M2
1.1kw
-M5
UP/DOWN
-M6
FEEDING


CONVERTER
COM /
FR2 /
REV /
SP1 /
Work Loop.1 / L1
Work Loop.1 / N
Open door
Up limit
Down limit
Fording limit
Back limit
Auto polish
Auto cut
Down & Auto cut
Fording
Back
Up
Cutting motor & pump

Problem	Cause	Solution
When the start switch is turned, the motor does not start.	-No mains voltage.	
	-The plug and socket are not connected properly.	-Check the mains.
	-The power supply cable is disconnected from the cabinet.	-Reset the correct connection
	-An electric wire inside the motor terminal board is disconnected.	-Connect the cable.
	-An electric wire inside the cabinet is disconnected.	-Contact an electrician for assistance.
		-Contact an electrician for assistance.
No cooling water for the blade	-The mains switch is faulty.	-Change the switch.
	-A fuse inside the cabinet has blown.	-Change the fuse.
	-Consult machine cleaning, tank cleaning chapter .	
The disk does not cut.	-Incorrect disk rotation direction.	-Dismantle the disk and put it in the direction indicated on the disk label.
	-Worn disk.	-Fit a new disk.
Forced tilting of disk.	-Securing nut too tight.	-Loosen it.
The securing knobs do not function correctly.	-Thread damaged.	-Replace the knobs.